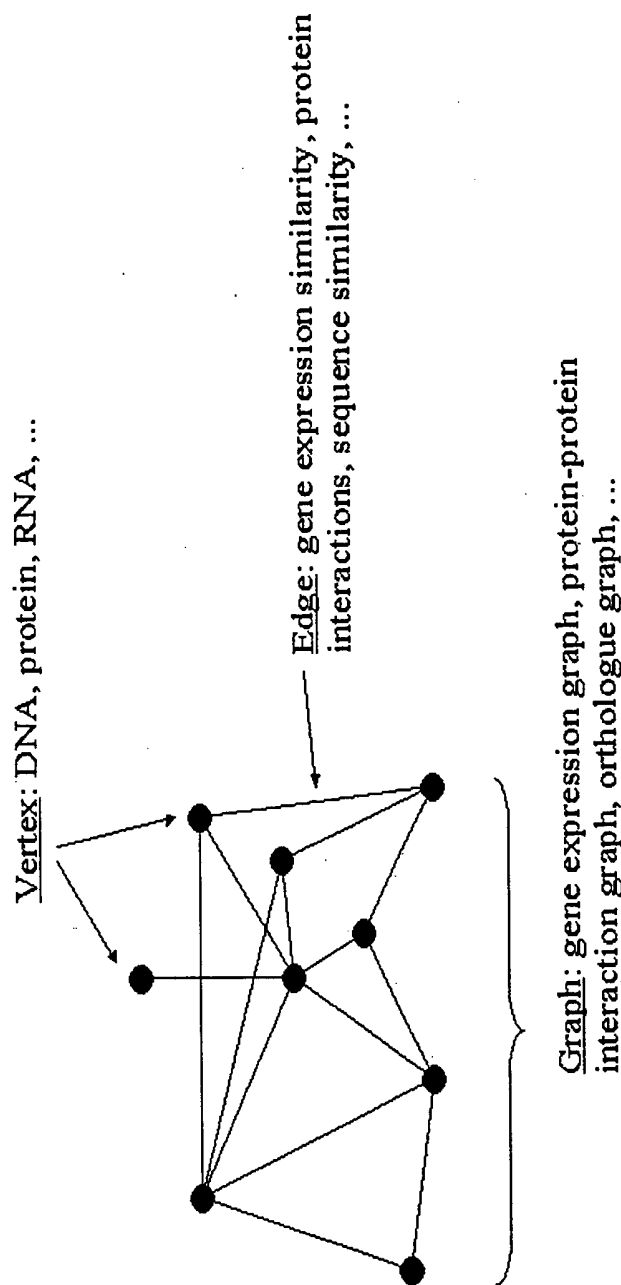


# FIG. 1



FOF20-8607600

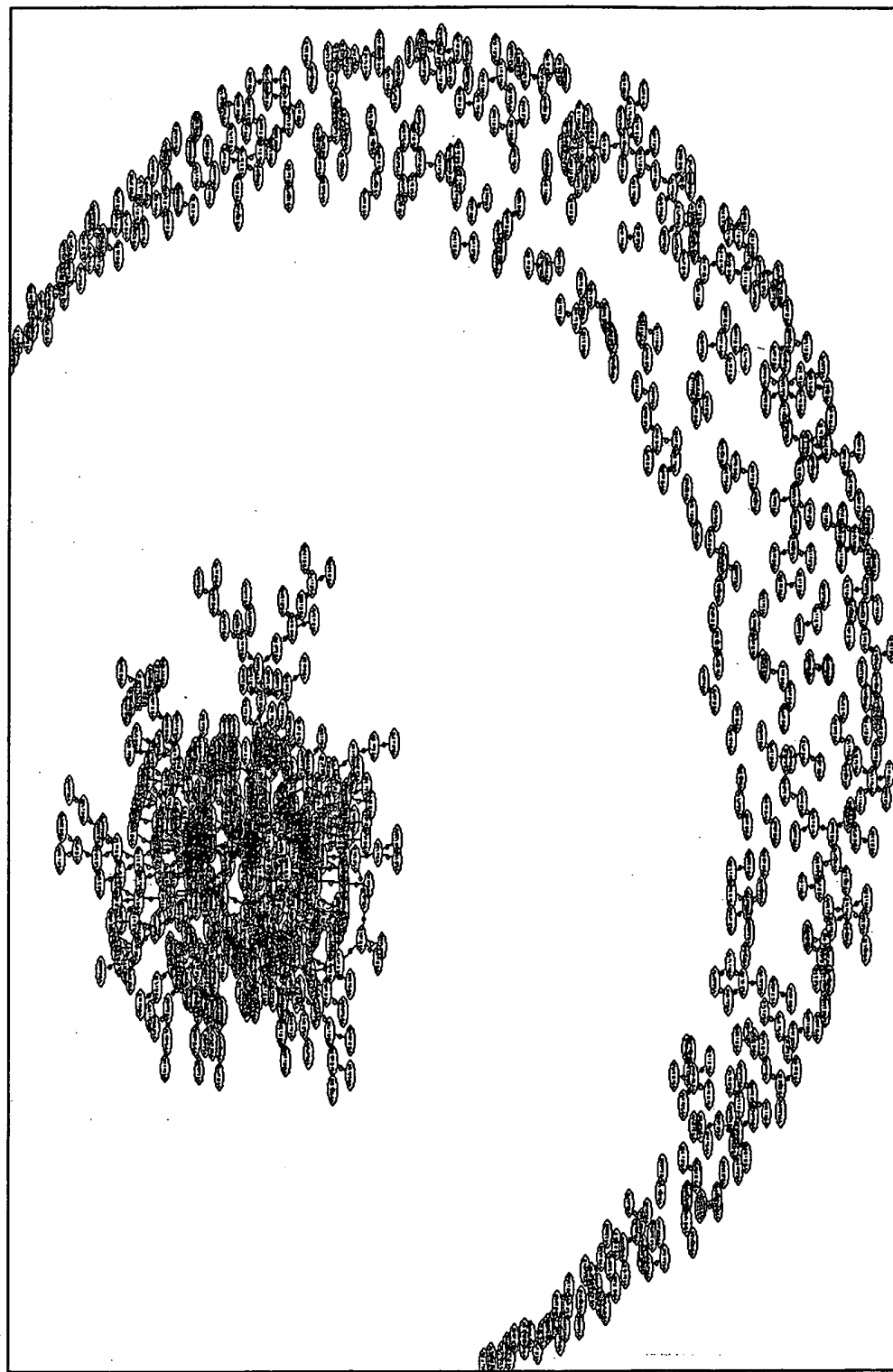


FIG. 2

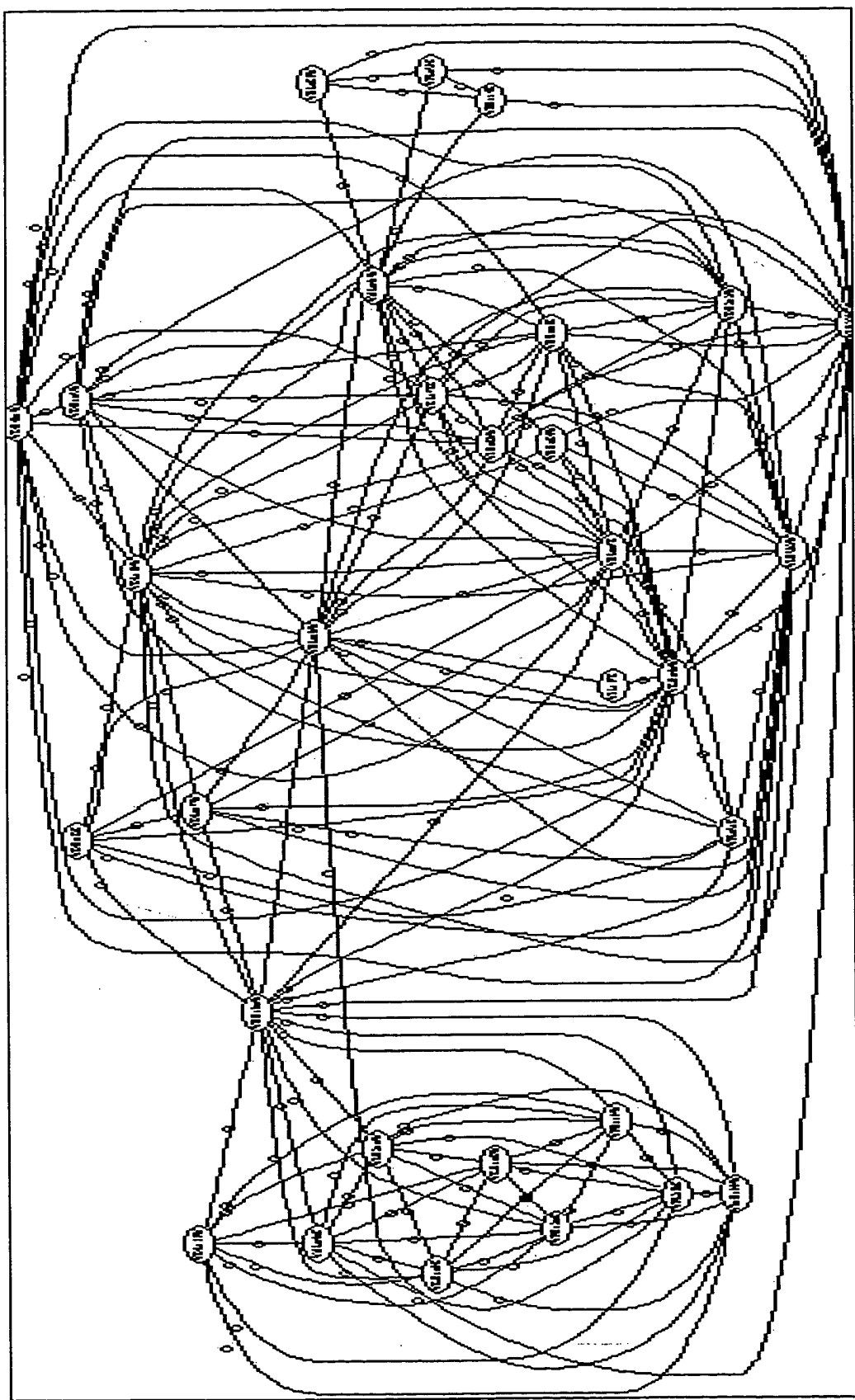


FIG. 3

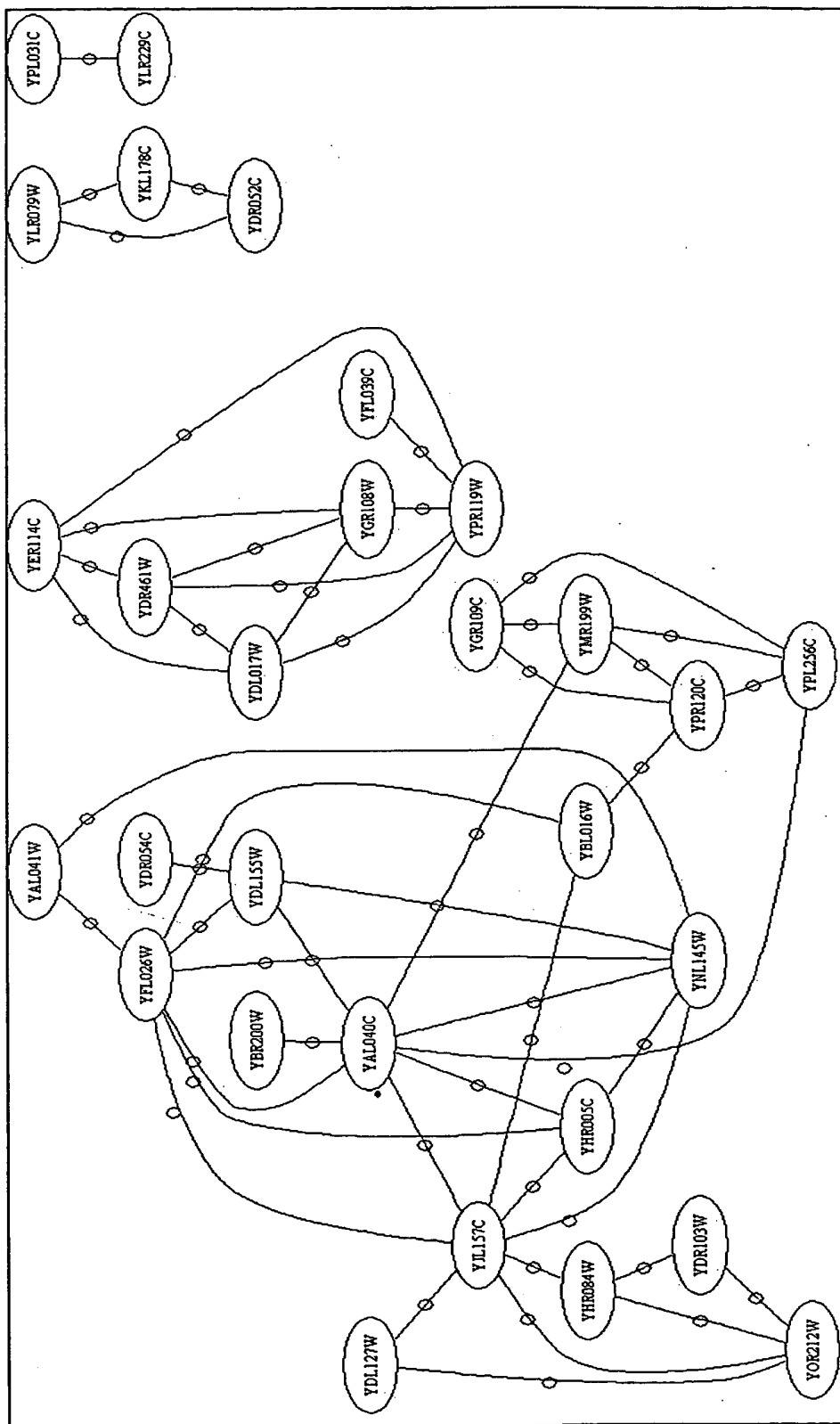
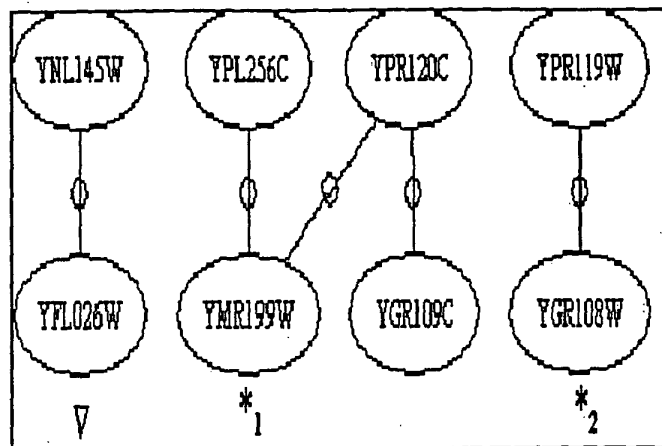
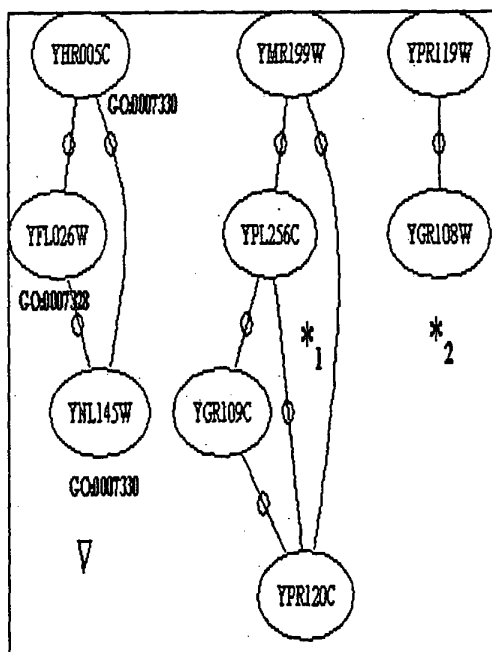


FIG. 4

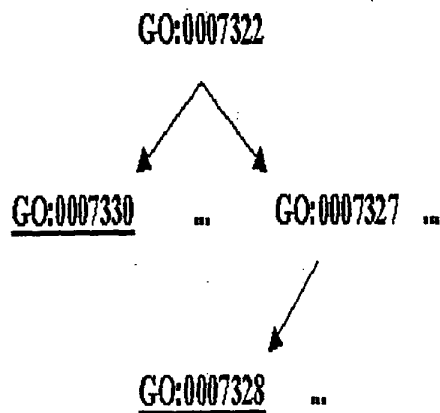
**B**



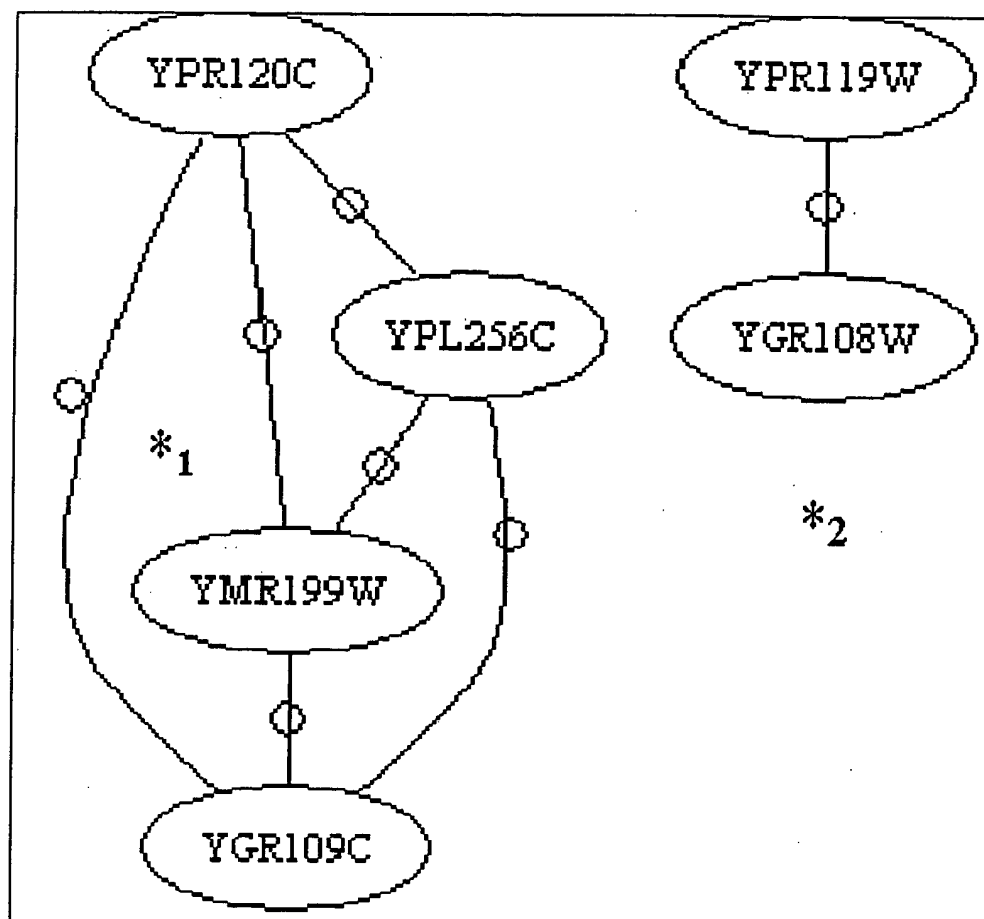
**C**



**E**



**FIG. 5**



**FIG. 5A**

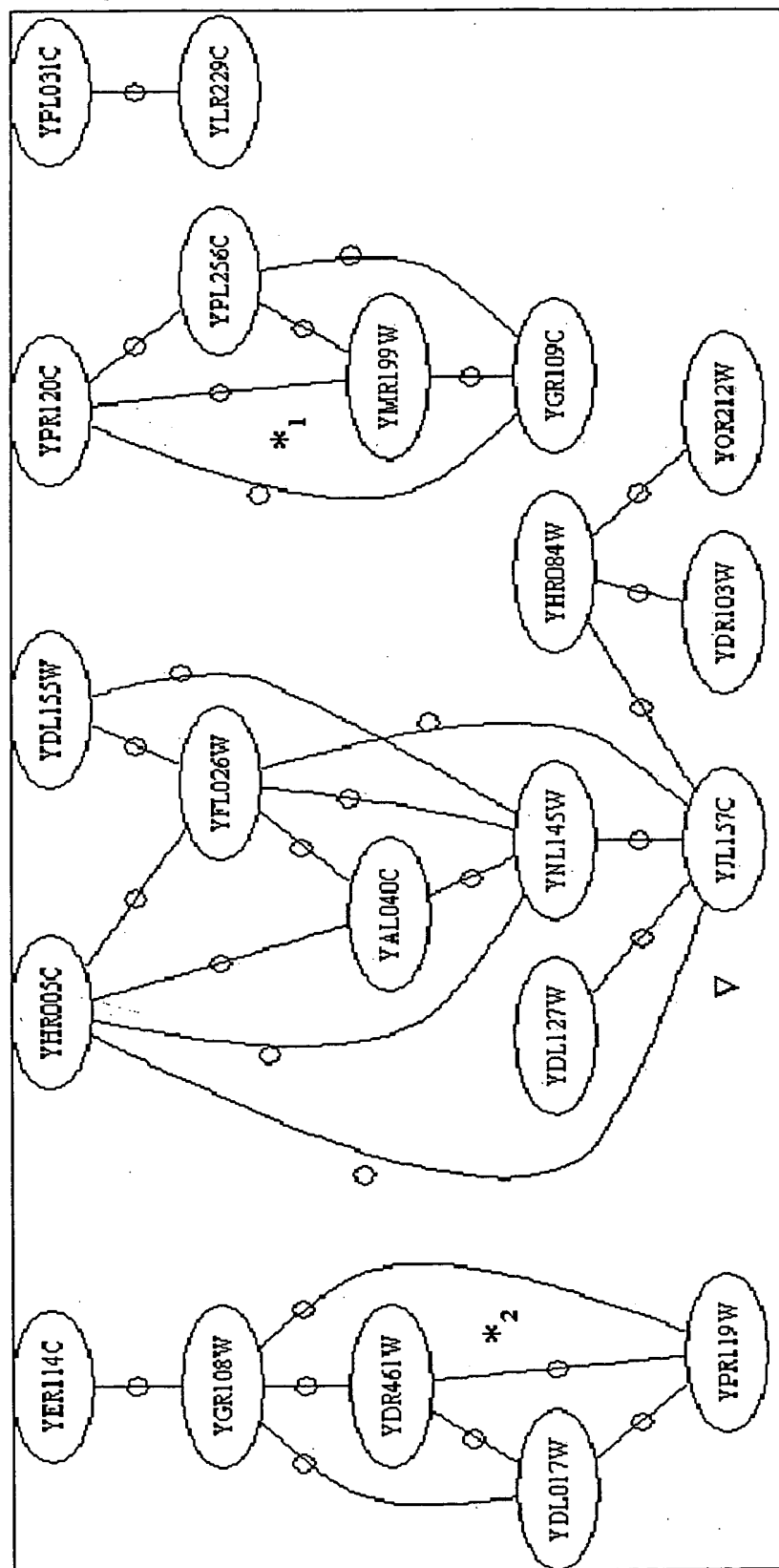
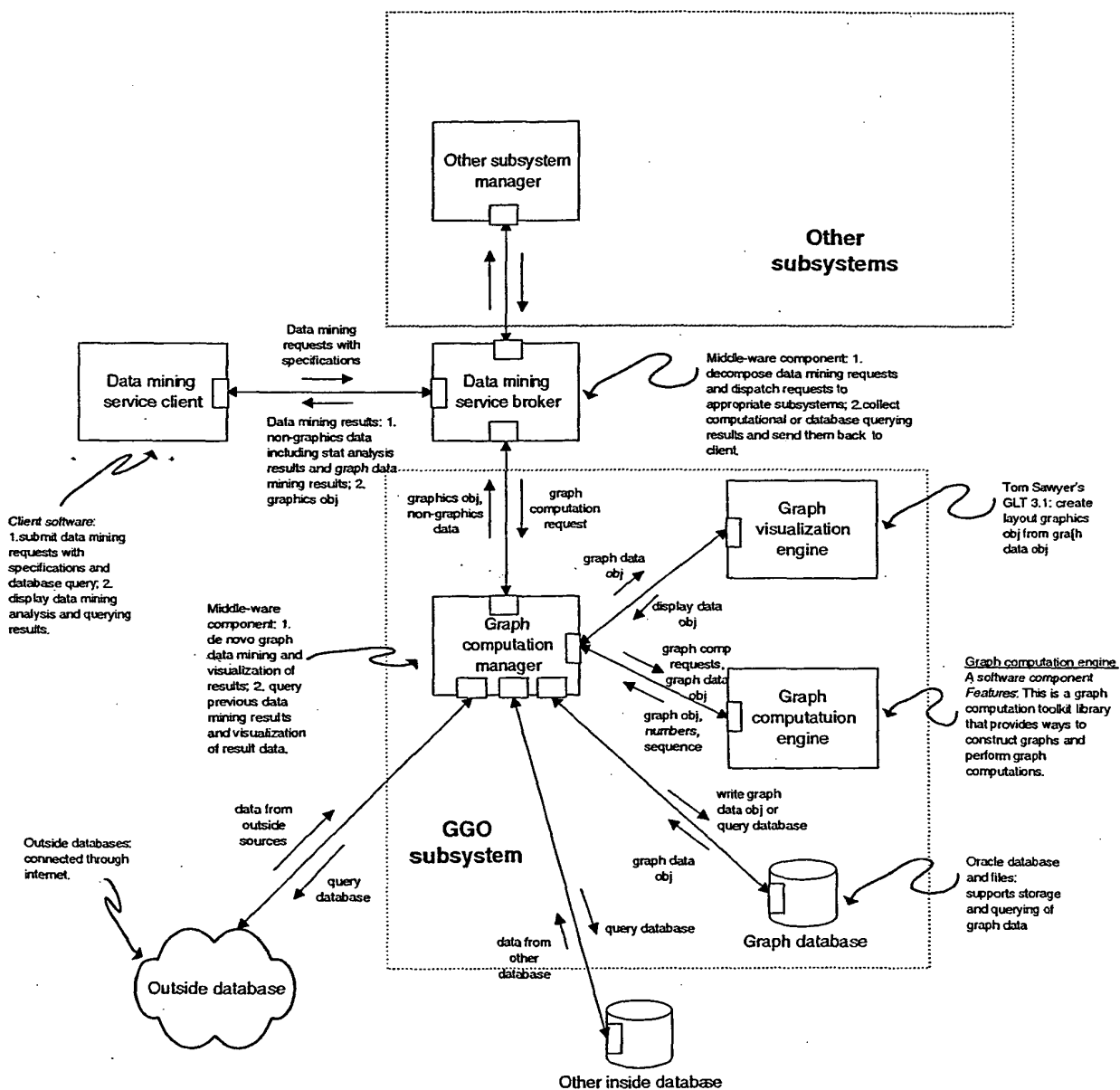


FIG. 5D

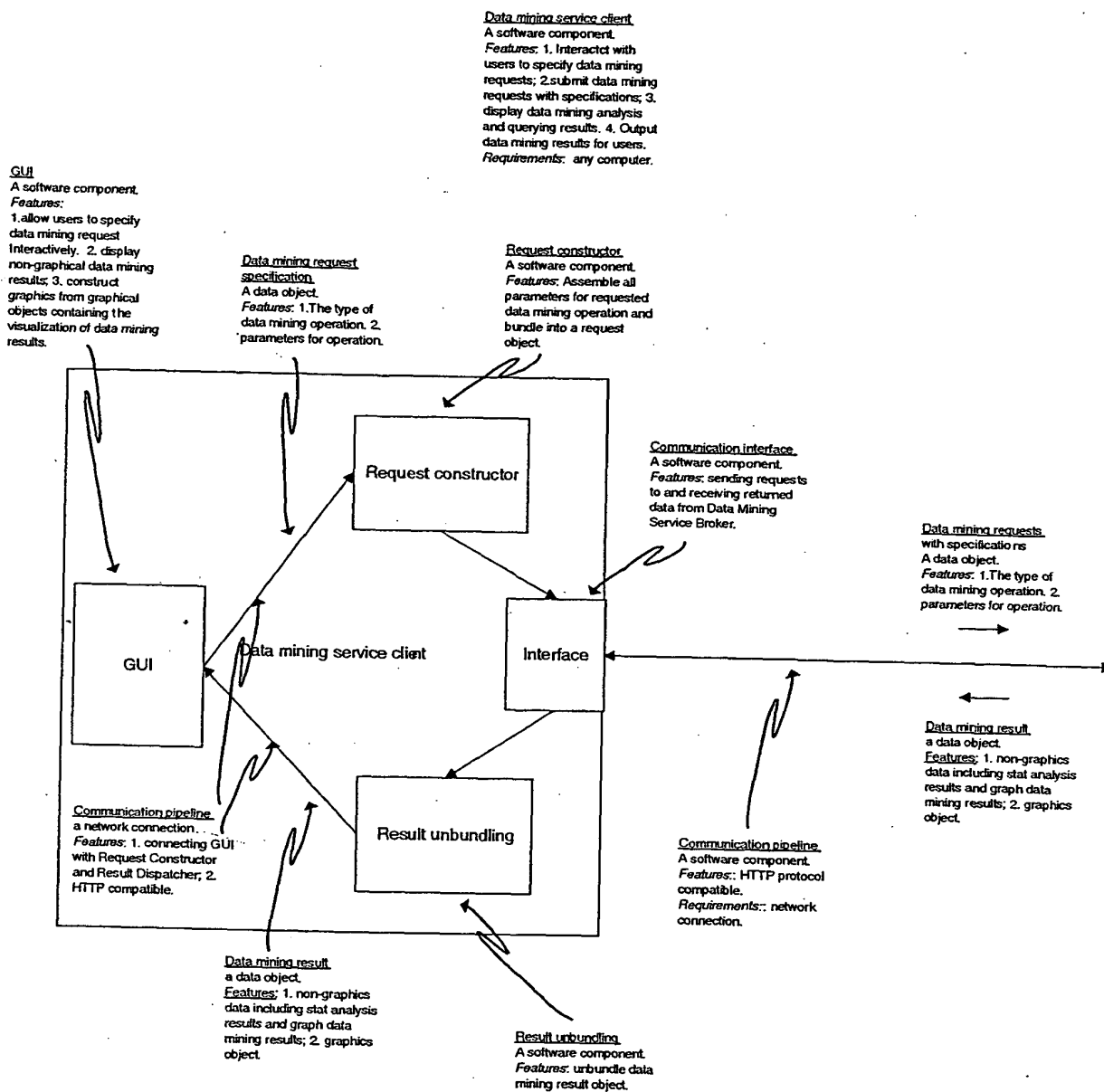
## Conceptual Design of Data Mining System: An Overview



# FIG 6



## Data mining service client



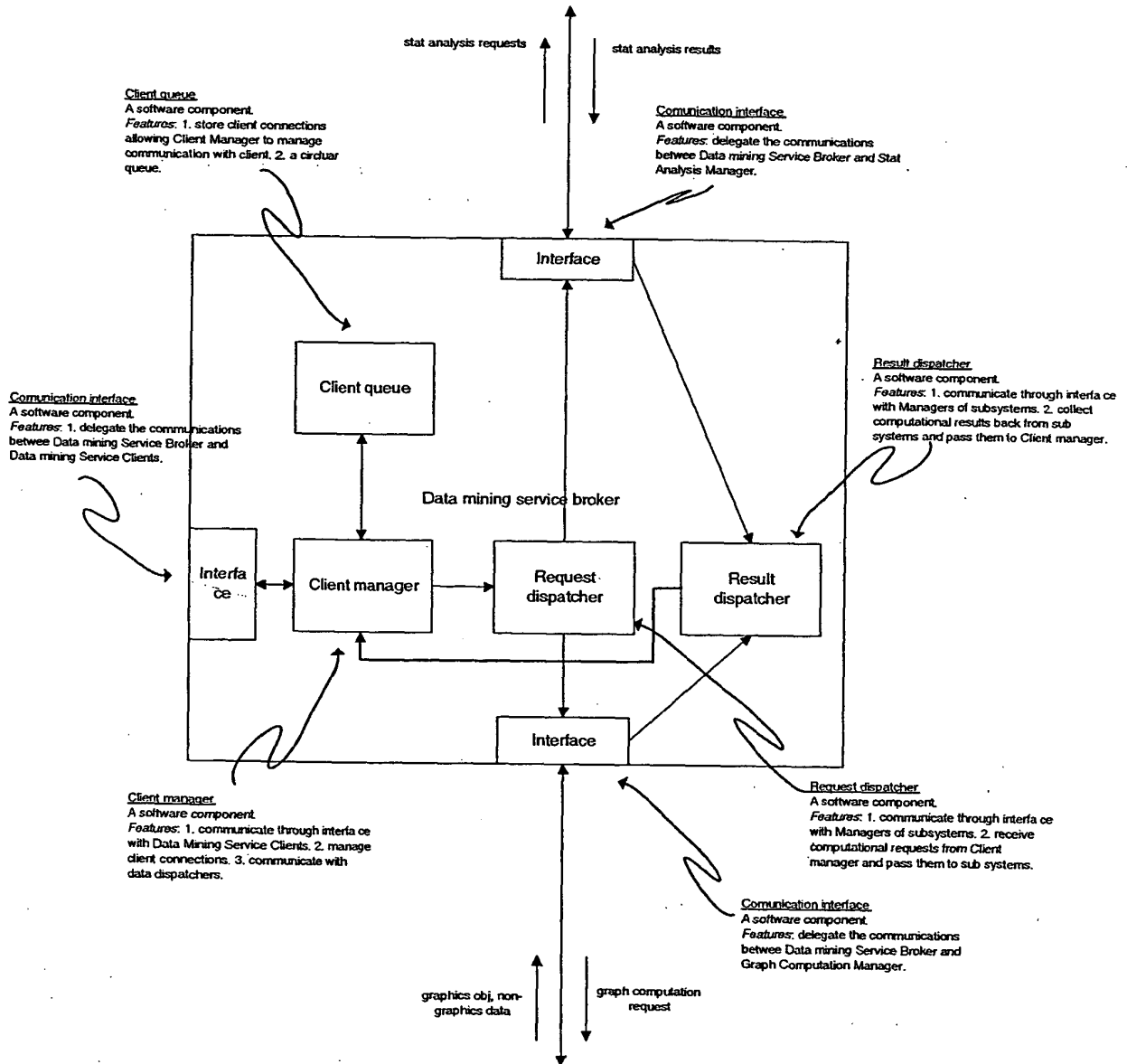
# FIG 7

## Data mining service broker

### Data mining service broker

A software component.

Features: 1. communicate with multiple data mining service clients; 2. decompose data mining request object and dispatch requests to appropriate subsystems; 3. receive computational or database querying request objects and send them back to client.



# FIG 8

# Graph computation manager

Middleware component: 1. de novo graph data mining and visualization of results; 2. query previous data mining results and visualization of result data.

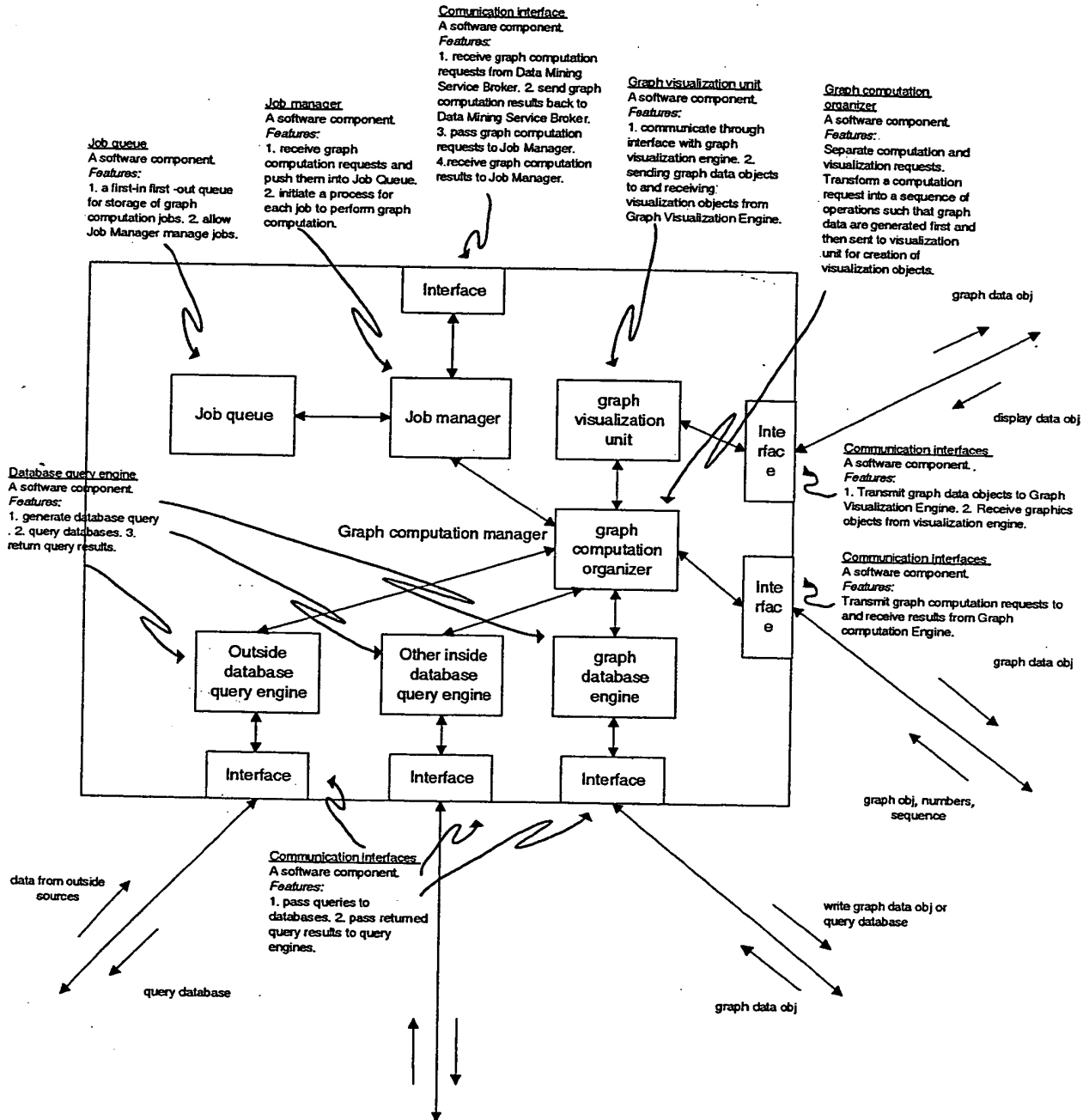
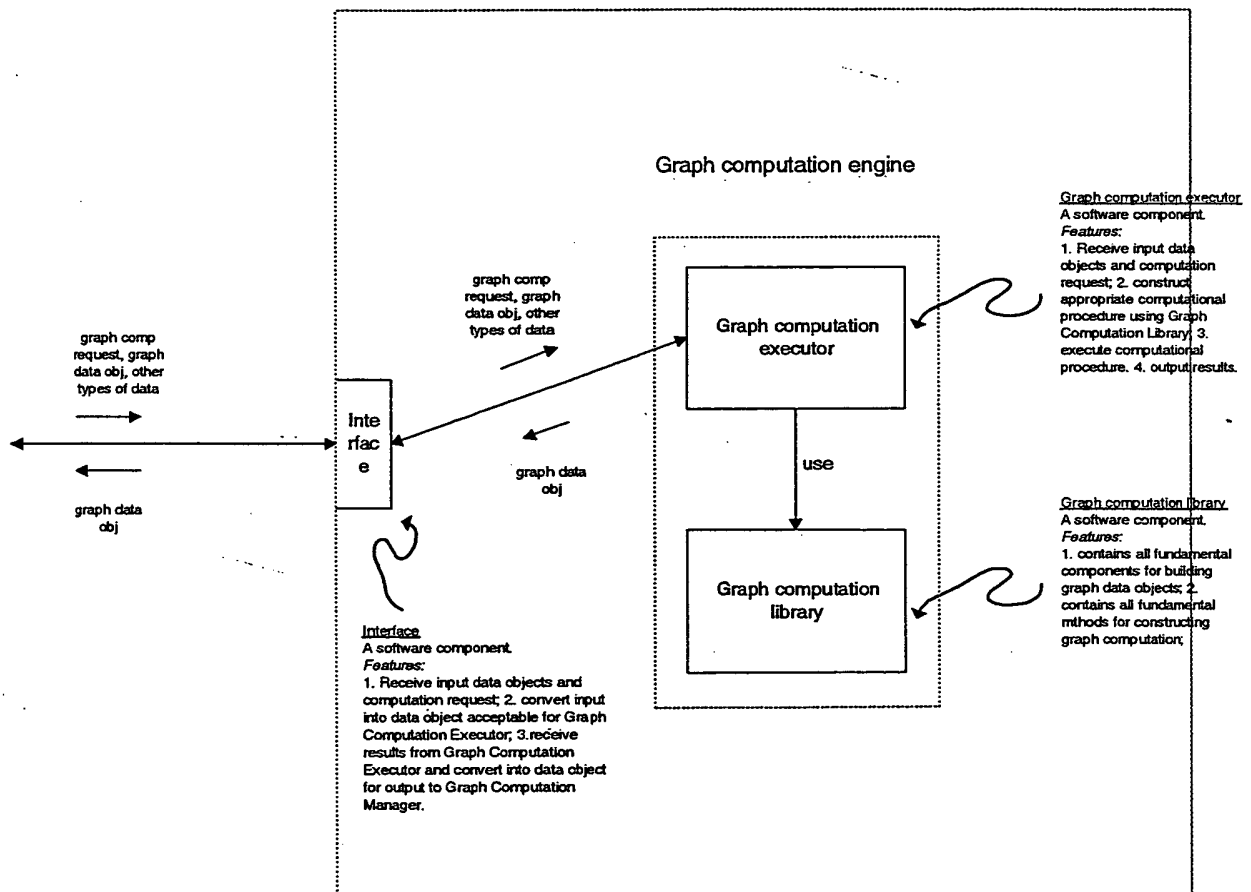


FIG 9

## Graph computation engine

Graph computation engine.  
A software component  
*Features:* This is a graph computation toolkit library that provides ways to construct graphs and perform graph computations.



# FIG 10

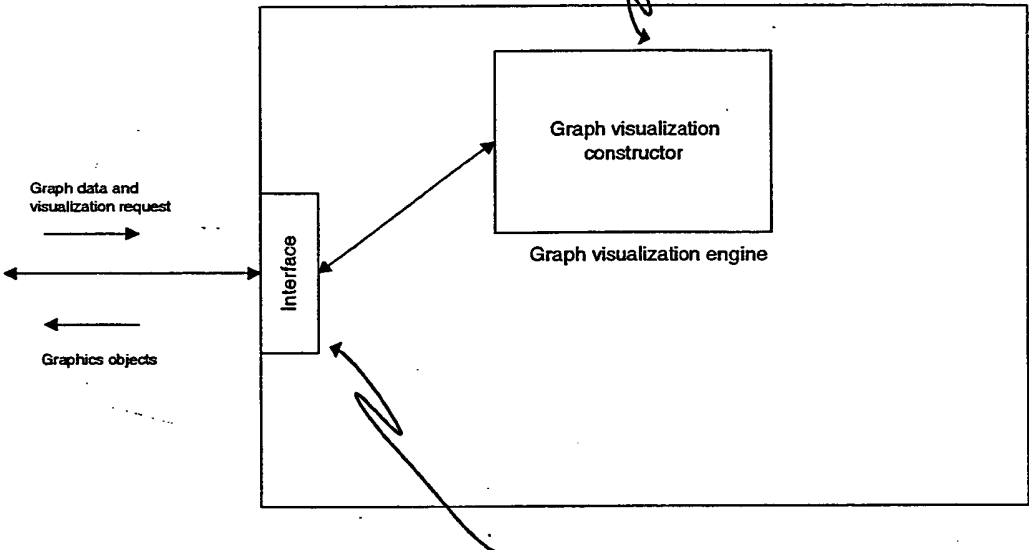
# Graph visualization engine

Graph visualization engine

*Features:*  
generate graphical  
visualization of graph data.

Graph visualization constructor

A software component.  
*Features:*  
construct graphics object from  
graph data.  
*Implementation:*  
Tom Sawyer's GLT or GET 3.1:  
create layout graphics object  
from graph data.



Communication interface

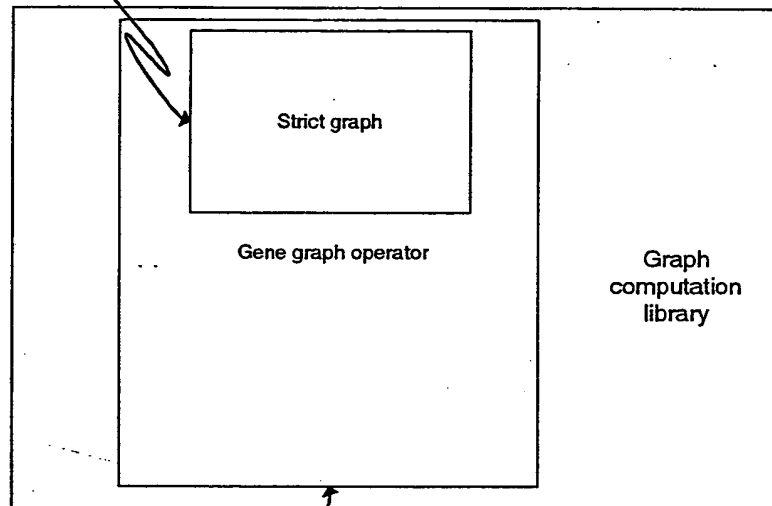
A software component.  
*Features:* delegate graph  
visualization requests and  
results between Graph  
Computation Manager and  
Graph Visualization Engine.

FIG 11

## Graph computation library

Graph computation library  
A software component.  
Features:  
1. contains all fundamental components for building graph data objects; 2. contains all fundamental methods for constructing graph computation; 3. contains all fundamental methods for building gene graph objects.

Strict graph  
A software component.  
Features:  
1. Provides all representations for graph data objects. 2. Provides all methods for computation of graph objects.



Gene graph operator  
A software component.  
Features: 1. Provide representations for all types of gene graphs. 2. Delegate the underlying graph representation and computation to Strict Graph component.

# FIG 12

## Data interface

### Data interface

A software component.

#### Features:

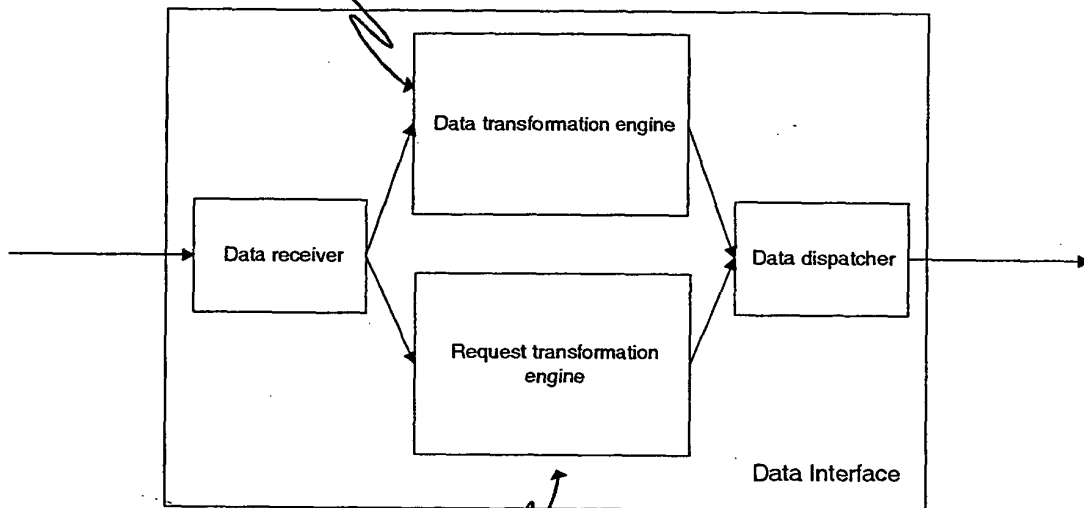
1. Receive, transform, and output computational request data objects;
2. Receive, transform, and output graph data objects.

### Data transformation engine

A software component.

#### Features:

Transform graph data objects so that graph data can be converted from a source format into a destination format.



### Request transformation engine

A software component.

#### Features:

Transform computational request data objects so that requests can be converted from a source format into a destination format.

# FIG. 13

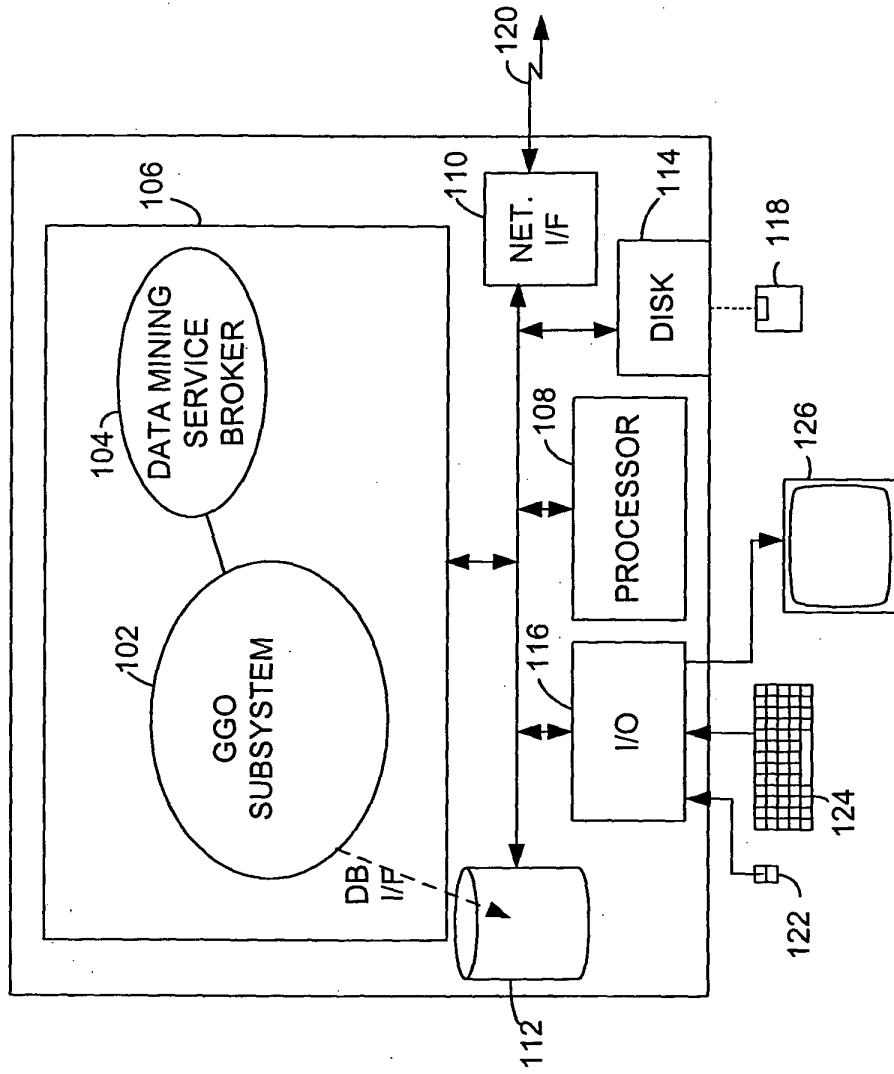


FIG. 14



